

Operational Plan: Sampling Pacific Halibut and Groundfish Sport Harvest for Biological Attributes in Southeast Alaska, 2022–2023

by

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and

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code		all standard mathematical signs, symbols and abbreviations	
deciliter	dL		AAC		
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H _A
hectare	ha			base of natural logarithm	<i>e</i>
kilogram	kg	all commonly accepted		catch per unit effort	CPUE
kilometer	km	professional titles	e.g., Dr., Ph.D., R.N., etc.	coefficient of variation	CV
liter	L			common test statistics	(F, t, χ^2 , etc.)
meter	m	at	@	confidence interval	CI
milliliter	mL	compass directions:		correlation coefficient (multiple)	R
millimeter	mm	east	E	correlation coefficient (simple)	r
Weights and measures (English)		north	N	covariance	cov
cubic feet per second	ft ³ /s	south	S	degree (angular)	°
foot	ft	west	W	degrees of freedom	df
gallon	gal	copyright	©	expected value	<i>E</i>
inch	in	corporate suffixes:		greater than	>
mile	mi	Company	Co.	greater than or equal to	≥
nautical mile	nmi	Corporation	Corp.	harvest per unit effort	HPUE
ounce	oz	Incorporated	Inc.	less than	<
pound	lb	Limited	Ltd.	less than or equal to	≤
quart	qt	District of Columbia	D.C.	logarithm (natural)	ln
yard	yd	et alii (and others)	et al.	logarithm (base 10)	log
Time and temperature		et cetera (and so forth)	etc.	logarithm (specify base)	log ₂ , etc.
day	d	exempli gratia (for example)	e.g.	minute (angular)	'
degrees Celsius	°C	Federal Information		not significant	NS
degrees Fahrenheit	°F	Code	FIC	null hypothesis	H ₀
degrees kelvin	K	id est (that is)	i.e.	percent	%
hour	h	latitude or longitude	lat or long	probability	P
minute	min	monetary symbols		probability of a type I error	
second	s	(U.S.)	\$, ¢	(rejection of the null hypothesis when true)	α
Physics and chemistry		months (tables and figures): first three		probability of a type II error	
all atomic symbols		letters	Jan,...,Dec	(acceptance of the null hypothesis when false)	β
alternating current	AC	registered trademark	®	second (angular)	"
ampere	A	trademark	™	standard deviation	SD
calorie	cal	United States		standard error	SE
direct current	DC	(adjective)	U.S.	variance	
hertz	Hz	United States of America (noun)	USA	population sample	Var
horsepower	hp	U.S.C.	United States Code		var
hydrogen ion activity (negative log of)	pH				
parts per million	ppm	U.S. state	use two-letter abbreviations		
parts per thousand	ppt, ‰		(e.g., AK, WA)		
volts	V				
watts	W				

REGIONAL OPERATIONAL PLAN NO. ROP.SF.1J.2022.04

**OPERATIONAL PLAN: SAMPLING PACIFIC HALIBUT AND
GROUNDFISH SPORT HARVEST FOR BIOLOGICAL ATTRIBUTES IN
SOUTHEAST ALASKA, 2022–2023**

by

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May 2022

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SIGNATURE/TITLE PAGE

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ABSTRACT

This project monitors age, size, and sex characteristics of Pacific halibut *Hippoglossus stenolepis* and rockfish species *Sebastes spp.*, and biological data from other groundfish species landed by sport anglers at four strategically selected ports in Southeast Alaska. Data will be combined with catch, harvest and effort estimates and biological data from Alaska Department of Fish and Game's Southeast Alaska Marine Harvest Studies program and the Alaska Sport Fishing Survey to assess trends, evaluate changes in stock status, and design regulations that protect stocks and provide for long-term sustained yield. This project will support dockside sampling by the Marine Harvest Studies program in Southeast Alaska to collect otoliths and other biological data from harvested Pacific halibut and black rockfish *Sebastes melanops*, and species composition of harvested rockfish, from charter and unguided saltwater boat anglers. Estimates of species composition (rockfish), age composition and average weight captured from this project will be combined with charter logbook and Alaska Sport Fishing Survey harvest and release information for SEAK to estimate biomass of recreational fishing mortality of Pacific halibut and demersal shelf rockfish for all relevant management units in Southeast Alaska.

Data will be shared with the International Pacific Halibut Commission, the National Marine Fisheries Service, the North Pacific Fisheries Management Council, the Alaska Board of Fisheries, and the public. Survey areas sampled will include Elfin Cove, Sitka, Craig, and Ketchikan.

Keywords: Pacific halibut, *Hippoglossus stenolepis*, rockfish, *Sebastes spp.*, demersal shelf rockfish, DSR, otoliths, species composition, sport fishery, marine fishery, Southeast Alaska, SEAK

PURPOSE

The goal of this project is to provide additional information needed for management of Pacific halibut (*Hippoglossus stenolepis*) and rockfish (*Sebastes spp.*) sport fisheries in Southeast Alaska (SEAK) in accordance with the principle of sustained yield. Annual estimates of Pacific halibut sport harvest (by weight) are needed by the International Pacific Halibut Commission (IPHC) and North Pacific Fishery Management Council (NPFMC) to set harvest quotas for the upcoming year and evaluate the position of the charter boat harvest relative to the guideline harvest level. The data are also used by the NPFMC for analysis to address Pacific halibut allocation issues. Estimates of rockfish species composition are needed by the Alaska Department of Fish and Game (ADF&G) to apportion annual harvests by species, and corresponding harvest composition data are used to assess relative stock status and formulate management alternatives for consideration by the Alaska Board of Fisheries. This project is directly associated with—and nested within—the greater SEAK marine harvest studies (marine boat) program (SEAK MHS—marine boat; Jaenicke et al. 2022); this project aims to expand the collection of biological data associated with rockfish and Pacific halibut at 4 strategically selected ports in SEAK. This operational plan describes objectives, methods, and timelines for conducting these activities which expand on sampling objectives of the SEAK MHS—marine boat program.

BACKGROUND

The SEAK MHS—marine boat program annually collects length data on recreationally harvested halibut and rockfish, and species composition of harvested rockfish from ports throughout SEAK; this project—a companion to—and nested within the larger SEAK MHS—marine boat program is singularly focused on increasing the collection of Pacific halibut and rockfish biological data at 4 selected ports in SEAK (Figure 1) during 2022-2023. Age and sex data has been collected only from black rockfish since 2016 and only in Sitka. The addition of four onsite sampling technicians, whom will primarily be focused on collection of otoliths from Pacific halibut and black rockfish (*S. melanops*), will provide age and sex data from these species that will improve knowledge of stock status and assessment of these bottomfish species.

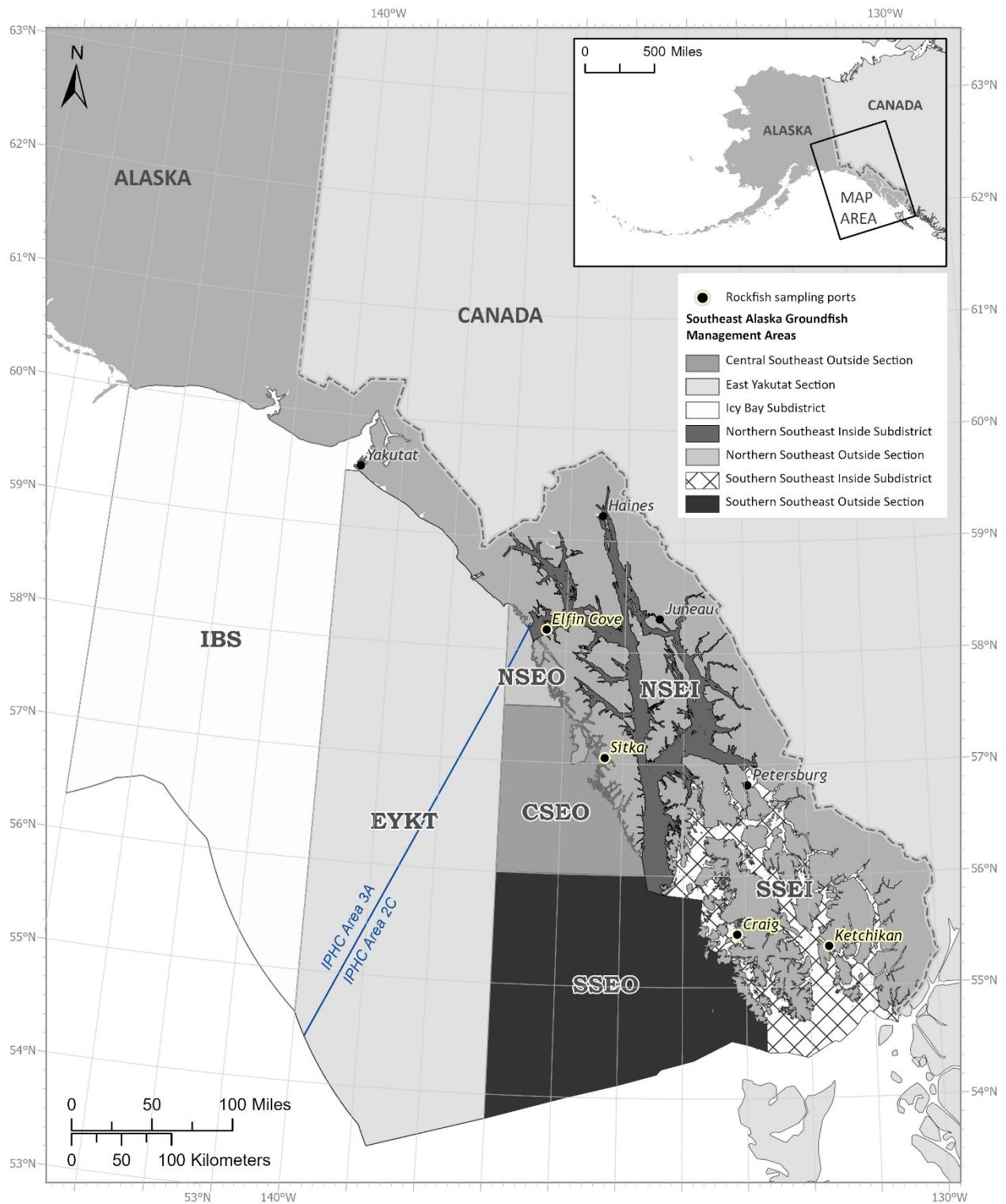


Figure 1.—Delineation of Division of Commercial Fisheries Groundfish Management Areas and four ports to have additional samplers in Southeast Alaska.

OBJECTIVES

This project is a companion project to the larger and more comprehensive SEAK MHS—marine boat program (Jaenicke et al. 2022) which captures all estimation and analytical objectives of the combined programs, including primary objectives and statistical estimation criteria. Only secondary objectives related to the sampling of biological attributes for Pacific halibut and rockfish are captured in this plan.

SECONDARY OBJECTIVES

Secondary Objectives for the 2022 and 2023 seasons are as follows:

- 1) Collect biological samples representing age (otoliths), sex, length from bottomfish/groundfish (with focus on Pacific halibut and black rockfish) at the ports of Elfin Cove, Sitka, Ketchikan, and Craig.
- 2) Collect sport fishery effort and catch data at the port of Elfin Cove.

METHODS

STUDY DESIGN

This companion project to the larger SEAK MHS—marine boat program involves collection of information at four ports in SEAK: Sitka, Craig, Ketchikan, and Elfin Cove (Figure 1). Each of these ports will be staffed with an additional sampler compared to historic levels—in a concerted effort to expand on the collection of biological data which will include otolith collection from Pacific halibut and black rockfish concurrent with the SEAK MHS—marine boat program monitoring slated for April through September 2022 and 2023 (Table 1).

The additional sampler in Sitka, Craig, and Ketchikan will be working in tandem with existing MHS—marine boat creel technicians at each port to increase the sampling rate of harvested bottomfish species, and incorporate the otolith collection objective. The Elfin Cove sampler will be the only technician at that port and will collect both biological and effort data from that port's exiting sport anglers.

The underlying study design, sample size goals, sampling schedules, data collection, and recording protocols to be implemented for this project are described in the Regional Operational Plan for the SEAK MHS—marine boat program (Jaenicke et al. 2022).

Table 1.—Ports that will be sampled within Southeast Alaska in 2022-2023 with an additional sampler for the SEAK MHS—marine boat program.

Ports	SWHS Area (Area code/Groundfish Management Area)
Elfin Cove	Glacier Bay (Area G/NSEO and NSEI)
Sitka	Sitka (Area D/CSEO)
Craig	Prince of Wales Island (Area B/SSEI and SSEO)
Ketchikan	Ketchikan (Area A/SSEI)

Pacific halibut

Sport charter harvest of Pacific halibut is managed under a Catch Sharing Plan (CSP) adopted by the NPFMC in October 2012 and which went into effect on 13 January 2014. Prior to this, the fishery was managed under a Guideline Harvest Level (GHL). Under the new CSP, charter businesses can lease commercial individual fishing quota (IFQ) as guided angler fish (GAF) to allow their guided anglers to harvest halibut under private regulations.

Average weights of Pacific halibut in the sport harvest are needed to estimate removals in weight units for purposes of stock assessment and management. Estimates of fishery parameters obtained by this project will be used by Division of Sport Fish, Research and Technical Services (RTS) staff for estimation and projection of SEAK sport harvest as described in Meyer (2014). The project described in Meyer (2014) will combine the average weights for both components of the fishery (guided and unguided) from the on-site sampling project described herein with estimates from the SWHS and logbooks to obtain estimates and projections of sport halibut removals in biomass units for both the NPFMC and the IPHC. Additionally, release information for halibut will be provided to RTS for use in estimating total mortalities. These data will be utilized to help assess the performance of the current “reverse slot limit size restrictions”¹ while simultaneously addressing contemporary assumptions about halibut discard mortality rates in the Southeast Alaska halibut sport fishery. Finally, the proportion of unguided halibut harvest that occurs prior to the mean IPHC survey date will also be provided as requested by the IPHC.

Collection of otoliths and corresponding identification of sex will provide information on the age and sex structure of the population being harvested by the sport fishery.

Rockfish

The recreational fishery for demersal shelf rockfish (DSR) in the Southeast Outside (SEO) Subdistrict—which consists of SSEO, CSEO, NSEO, and EYKT (Figure 1)—is managed by ADF&G under allocations determined in regulation 5 AAC 28.160 as a percentage of the total allowable catch (TAC) approved by the NPFMC annually. Therefore, this project will estimate species composition and average weights of the sport harvest for the NPFMC using species-specific length-weight relationships. The 7 DSR species are yelloweye *Sebastes ruberrimus*, quillback *S. maliger*, copper *S. caurinus*, canary *S. pinniger*, tiger *S. nigrocinctus*, China *S. nebulosus*, and rosethorn *S. helvomaculatus* rockfish. Numbers of DSR released will also be recorded by species to estimate release mortality. Estimates of species composition, average weight, discard mortality rate (from literature), number of fish released, of particular species and species groupings will be combined with charter logbook and Alaska Sport Fishing Survey (SWHS) harvest information to obtain estimates of the biomass for the sport fishery in outside waters of SEAK. In 2020 - 2021 the retention of the 7 DSR species was prohibited in SEAK, but illegal harvest and release numbers were still recorded. In 2022, resident anglers are allowed a daily bag limit of one DSR besides yelloweye, thus harvest of these 6 DSR species will be recorded. Average weight for release mortality will be based on recent year’s average weight of harvested rockfish by species by class (Jaenicke et al. 2022). Additionally, species composition of the rockfish harvest in all ports will be estimated.

¹ Under a reverse slot limit, anglers are allowed to retain fish that are smaller than or larger than the slot, not within. For 2022, the lower and upper bounds of the reverse slot limit are 40 inches and 80 inches, respectively for guided anglers.

This collection of otoliths from black rockfish will provide information on the age structure of the populations being harvested by the sport fisheries at NSEO, NSEI, CSEO, SSEO, and SSEI and will be utilized by the ADF&G Statewide Rockfish Initiative (SRI) group to aid in the management of these long-lived fish species in SEAK.

Design by Port

Sitka, Craig, and Ketchikan

The port cities of Sitka, Craig, and Ketchikan currently have from four to six SEAK MHS creel technicians sampling the sport fisheries at these respective ports during April-September of each season. The additional biological samplers for this operational plan (one new biological sampler at each port) will work in tandem with one of the creel interview technicians already scheduled, to increase the sampling rate of bottomfish species, and to add the collection of otoliths from halibut and rockfish.

Elfin Cove

The port city of Elfin Cove will be sampled by one field technician for both effort and catch data, and biological data during May-August 2022 (Appendix A1) and similarly in 2023. The methods and sampling procedures will be identical to those utilized by the SEAK MHS program creel interview technicians (Jaenicke et al. 2022).

DATA COLLECTION

Biological Sampling

Biological sampling methods and instructions for halibut and rockfish species can be found in the SEAK MHS—marine boat ROP (Jaenicke et al. 2022) and the MHS Tech manual (ADF&G *Unpublished*)². Sex and length information to the nearest 0.5 cm will be collected from halibut and rockfish, and recorded on paper and/or handheld electronic devices (i.e., iPads) with the MHS app (Jaenicke et al. 2022). Sampling goals for lengths (which are used to derive estimated weights) of halibut and black rockfish (Appendix A1 and A2; respectively) are accomplished by each ports' group of MHS technicians contributing to that sampling effort. Sampling goals for halibut and black rockfish otoliths and sex (Appendix A3) will be similar to Southcentral Alaska's Sport Fish Halibut and Bottomfish Sampling program (Schuster and Ford 2022), where there are no firmly set minimum sample sizes, though in general their field sampling program achieves a sampling rate of 1-2% of the total harvest (M. Schuster, Sport Fish Biologist, ADF&G, Homer, *personal communication*), which is how goals for SEAK were established.

Otoliths will be collected and used to determine age. The left (ventral) otolith (saggitus) will be removed from halibut. Both otoliths will be removed from sampled black rockfish. Halibut and black rockfish otoliths will be hand-cleaned in water and stored in the labeled coin envelopes recorded with associated biological data (Schuster and Ford 2022; Tersteeg et al. 2022; ADF&G *Unpublished*²; Schuster and Ford *Unpublished*³).

Note that the subsistence fishery for halibut began in May 2003. Subsistence fishing for halibut is allowed in all federal waters and all state waters that are outside of nonsubsistence areas.

² ADF&G. *Unpublished*. 2022 Southeast Alaska marine harvest studies creel technician manual. ADF&G, Division of Sport Fish, Juneau, Alaska.

³ Schuster, M., and M. Ford. *Unpublished*. 2021 Field procedure manual, Southcentral Alaska halibut and groundfish harvest assessment program. ADF&G, Division of Sport Fish, Homer, Alaska.

Technicians may encounter subsistence-caught halibut and other bottomfish taken as bycatch in the subsistence fishery. Technicians will determine whether the halibut or other species were harvested by subsistence or sport fishing. No halibut, rockfish, or lingcod caught by subsistence users will be sampled or recorded in this project.

DATA ANALYSIS

Mean weight of halibut and rockfish

Estimation of halibut mean weight by angler type from the sampled sport fisheries at the four ports will include the revised IPHC length-weight relationship (Webster and Stewart 2022) and is presented in Jaenicke et al. (2022). Estimation of rockfish mean weight by angler type will include the length-weight relationships utilized by the SEAK MHS Program (Jaenicke et al. 2022).

SCHEDULE AND DELIVERABLES

Dates	Activity
May – September 2022 and 2023	Data collection at all ports, including the four identified in this op plan.
Second half of September 2022 and 2023	Data collection completed at all ports. Begin data reduction, data validation, and age determination.
October 2022 and 2023	Analysis and preliminary estimates of halibut mean weight Provide average weights data to ADF&G/Sport Fish Division/RTS Scientist for incorporation into memo to the International Pacific Halibut Commission.
As needed	Preliminary data summaries to the North Pacific Fishery Management Council, Alaska Board of Fisheries, other agencies, and public.
Fall–Winter 2022 and 2023	Analysis and report preparation for previous years’ data.

Preliminary estimates of halibut harvest will be reported to the IPHC in October annually (Meyers 2014), and final estimates will be reported in an ADF&G, Division of Sport Fish Special Publication following publication of the statewide harvest survey estimates. Halibut data summaries will be provided to the NPFMC as needed for analyses of management alternatives, and to National Marine Fisheries Service (NMFS) regulators, the Alaska Board of Fisheries, Fish and Game Advisory Committees, or individuals as requested. The 2022 season data will be presented when the SWHS estimates become available in 2023. Interim estimates may also be incorporated in Joint Divisional Series reports and may be presented to the Alaska Board of Fisheries pending action on regulatory proposals.

RESPONSIBILITIES

Michael Jaenicke, Fishery Biologist III

Duties: Helps coordinates all aspects of the overall MHS project and these additional bottomfish samplers. Assists biometrician with study design and schedule generation. Performs and coordinates data analyses in conjunction with biometrician. Co-author of final report and provides inseason data to appropriate personnel. Provides support and advice to direct supervisors of the project personnel.

Jeff Nichols, Fishery Biologist IV

Duties: Helps coordinates all aspects of the overall MHS project and these additional bottomfish samplers. Co-author of final report and provides inseason data to appropriate personnel. Provides support and advice to direct supervisors of the project personnel.

Diana Tersteeg, Research Analyst II

Duties: Performs data analyses in conjunction with project leader and biometrician. Responsible for oversight of continued development and maintenance of the handheld computer data entry software and SQL database. Design and write programs or queries using various statistical software packages such as SAS or database programs. Create statistically valid reports and technically detailed tables and figures necessary to meet the annual reporting requirements of the program. Provides assistance with operational planning and report writing.

Craig Schwanke (Craig-Klawock), Fishery Biologist III

Duties: Performs day-to-day oversight, supervision, and logistics of onsite creel sampling personnel at Craig.

David Love (Juneau/Elfin Cove), Jake Wieliczkievich (Sitka), and Anna Buettner (Ketchikan), Fishery Biologist II

Duties: Performs day-to-day oversight, supervision, and logistics of onsite creel sampling personnel at Elfin Cove, Sitka, and Ketchikan.

Adam Lake, Scott Bucy, Elizabeth Vossen, Jay Kingery

Duties: As crew leader in Juneau, Sitka, Ketchikan, and Craig/Klawock helps supervise and train the MHS personnel in Elfin Cove, Sitka, Ketchikan, and Craig, in addition to checking and editing data.

Fish and Wildlife Technicians (4)

Duties: Collect biological and fishery data following procedures outlined in the operational plan and other instructions, complete data forms in an accurate and timely manner, identify sampling needs and problems, provide fishery information to the regional office for weekly fishing reports, explain the sampling program to the general public, maintain state vehicles and other equipment in good working order, and submit all necessary paperwork in a neat and timely manner.

Sarah Webster, Fisheries Scientist I

Duties: Analyze collected length data for mean weight of halibut, estimate harvest biomass, and present results to IPHC and NPFMC. Analyze mean weight of black and DSR rockfish, estimate harvest and release biomass, and present results to NPFMC and PLAN team.

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APPENDIX A: SAMPLING GOALS

Appendix A1.—Sample size and relative precision for Pacific halibut mean weight in 2021 and goals for 2022 by port and angler class.

Port	Angler Class	2021: Number of Fish Sampled	2021: Relative Precision for 90% CI	2021: Percent Sampled of Observed Harvest	2022: Relative Precision Goal for 90% CI	2022: Sampling Goals
Ketchikan	Unguided	959	15.08%	52.87%	20%	40%
Craig	Unguided	200	25.50%	21.79%	20%	35%
Sitka	Unguided	130	28.26%	20.16%	30%	40%
Elfin Cove	Unguided	-	-%	-%	20%	50%
Ketchikan	Guided	668	17.68%	42.41%	20%	40%
Craig	Guided	897	10.14%	29.20%	20%	15%
Sitka	Guided	1089	10.34%	16.61%	20%	10%
Elfin Cove	Guided	-	-%	-%	20%	25%

Appendix A2.—Sample size and relative precision for black rockfish mean weight in 2021 and goals for 2022 by port and angler class.

Port	Angler Class	2021: Number of Fish Sampled	2021: Relative Precision for 90% CI	2021: Percent Sampled of Observed Harvest	2022: Relative Precision Goal for 90% CI	2022: Sampling Goals
Ketchikan	Unguided	179	46.85%	53.27%	35%	80%
Craig	Unguided	53	34.97%	14.68%	30%	50%
Sitka	Unguided	24	45.43%	4.72%	25%	15%
Elfin Cove	Unguided	-	-	-	-	35%
Ketchikan	Guided	629	29.87%	43.23%	30%	50%
Craig	Guided	275	20.31%	6.62%	20%	10%
Sitka	Guided	350	14.49%	2.86%	20%	5%
Elfin Cove	Guided	-	-	-	-	20%

Appendix A3.—Sample size for Pacific halibut and black rockfish otolith and identification of sex during 2022 by port in Southeast Alaska.

Port	Sample Size: otolith & sex	
	Pacific Halibut	Black Rockfish
Ketchikan	275	275
Craig	400	400
Sitka	500	550
Elfin Cove	200	200
Total	1,375	1,425